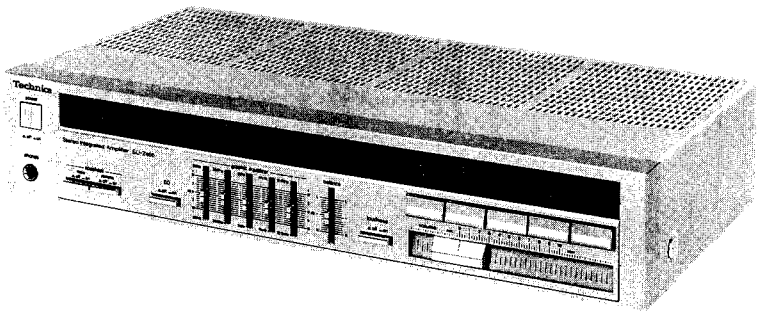
ORDER NO. HAD85032438C2

Service Manual

Amplifier

Stereo Integrated Amplifier

SU-Z450



Color

(K) . . Black Type
(S) . . . Silver Type

Color	Area
(K) (S)	[E] . . . . Continental Europe
(K) (S)	[EK] . . . United Kingdom
(K) (S)	[EGA] . . F.R. Germany
(K) (S)	[EF] . . . France
(K) (S)	[EH] . . . Holland
(K) (S)	[EB] . . . Belgium
(K) (S)	[EC] . . . Czechoslovakia
(K) (S)	[Ei] . . . . Italy

SPECIFICATIONS

(DIN 45 500)

■ AMPLIFIER SECTION

1 kHz continuous power output	
both channels driven	2 × 60W (8Ω)
40 Hz~20 kHz continuous power output	
both channels driven	2 × 50W (8Ω)
Total harmonic distortion	
rated power at 40 Hz~20 kHz	0.05% (8Ω)
half power at 1 kHz	0.007% (8Ω)
Intermodulation distortion	
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0.03%
Power bandwidth	
both channels driven, −3 dB	10 Hz~25 kHz (8Ω, 0.03%)
Damping factor	40 (8Ω)
Input sensitivity and impedance	
PHONO	2.5 mV/47kΩ
TUNER, CD/AUX, TAPE 1, 2/EXT	150 mV/22kΩ
PHONO maximum input voltage (1 kHz, RMS)	150 mV
S/N	
rated power (8Ω)	
PHONO	75 dB (IHF, A: 81 dB)
TUNER, CD/AUX, TAPE 1, 2/EXT	90 dB (IHF, A: 97 dB)
Frequency response	
PHONO	RIAA standard curve ±0.8 dB (30 Hz~15 kHz)
TUNER, CD/AUX, TAPE 1, 2/EXT	10 Hz~90 kHz (−3 dB)
Graphic equalizer frequency	80 Hz, 250 Hz, 1 kHz, 4 kHz, 12.5 kHz
Graphic equalizer range of variation	±10 dB
Loudness control (volume at −30 dB)	50 Hz, +9 dB
Output voltage	
REC OUT	150 mV
Channel balance, CD/AUX 250 Hz~6,300 Hz	±1.0 dB
Channel separation, CD/AUX 1 kHz	55 dB
Headphones output level and impedance	490 mV/330Ω
Load impedance	
MAIN or REMOTE	4Ω~16Ω
MAIN and REMOTE	8Ω~16Ω

■ GENERAL

Power consumption	290W
Power supply	
For United Kingdom	AC 50 Hz/60 Hz, 240V
For coninental Europe	AC 50 Hz/60 Hz, 220V
Dimensions (W×H×D)	430 × 86 × 240 mm (16-15/16" × 3-3/8" × 9-7/16")
Weight	4.9 kg (10.8 lb.)

Note:
Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

Specifications are subject to change without notice for further improvement.

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

SU-Z450

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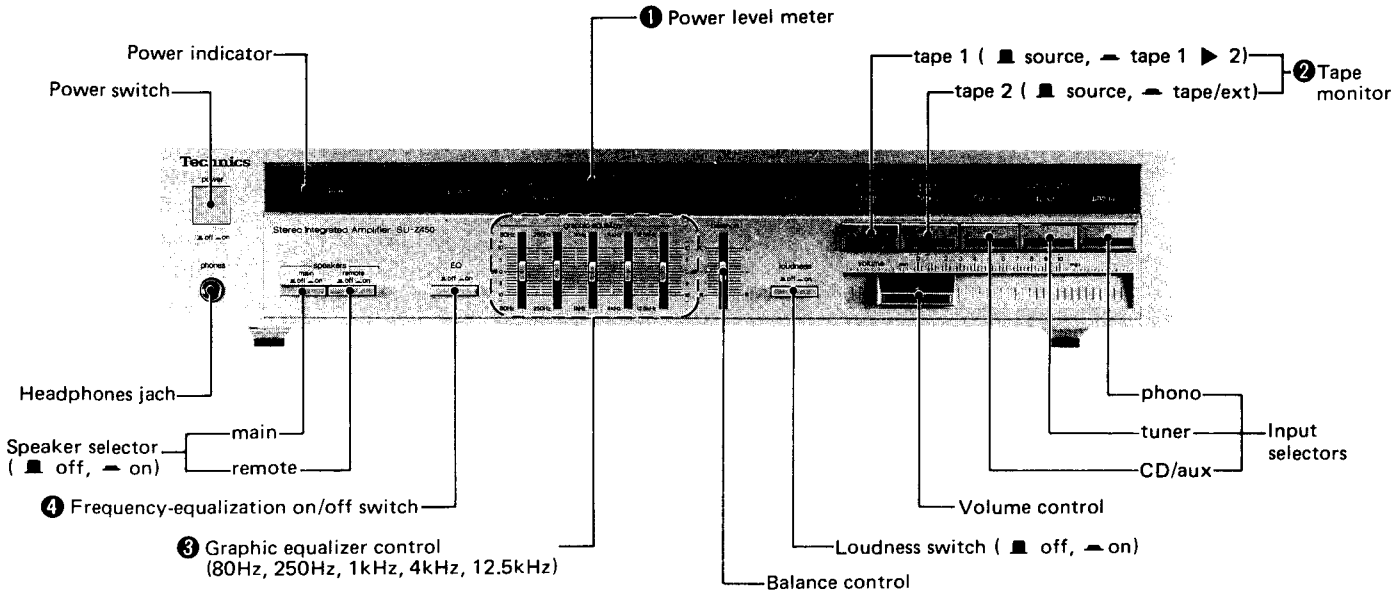
■ LOCATION OF CONTROLS



❶ Peak-power indicators (power level meter)

These indicators indicate the peak power value of the output level to the speaker systems.
If speaker systems with an impedance of 8 ohms are connected, the actual value can be read directly. If, however, the impedance is 16 ohms, the actual output value is 1/2 of the indicated value.

$$\text{Actual output} = \frac{\text{indicated value} \times 8\ \Omega}{\text{speaker impedance } (\Omega)}$$

❷ Tape monitor selectors (tape monitor)

source (▬→▮):
Set both selectors to this position in order to listen to phono discs, radio broadcasts, or equipment connected to the auxiliary input terminals ("CD/AUX"), and to record to tape deck 1 and/or 2.

tape/tape 1▶2 (▮→▬):
Set to this position to play back or monitor the sound from tape deck 1 or to record from tape deck 1 to tape deck 2. In this case be sure to set the right selector to the outward position.

tape/ext (▮→▬):
Set to this position to play back or monitor the sound from tape deck 2, or to use a microphone-mixing amplifier connected to the "TAPE 2/EXT" terminals.

Note:
If both tape-monitor selectors are depressed at the same time, only the sound from tape deck 2 will be heard.

❸ Equalizer controls (Graphic equalizer)

These controls are used to adjust the level within each frequency band. The levels can be varied continuously over a range of +10 dB~−10 dB.

80 Hz:
This is the deep bass range. By increasing the control setting, the sound of a bass guitar, drums, etc. can be made more massive and substantial.

250 Hz:
This is the ordinary bass range. By increasing the control setting, an extra feeling of richness and volume is added to the bass sound.

1 kHz:
This is the range in which most of the vocal range of the human voice is included. By increasing the control setting, vocal reproductions become more full of life and greater realism and ambience can be added.

4 kHz:
This is the range in which brightness and luster can be added to sounds. By increasing the control setting, sounds become more florid and gorgeously brilliant. By reducing the control setting, it is also possible to add a softer feeling to sounds which may seem too brilliant or metallic.

12.5 kHz:
This is the range in which finely subtle tones of radiance and splendorous luminance can be added. By increasing the control setting, an extra measure of glitter can be added, for example, to the sounds of the cymbals, triangle, etc. This control can also be used, by reducing its setting, to decrease annoying tape "hiss" noises.

ORDER NO. HAD85032438C2–A

Stereo Integrated Amplifier

SU-Z450

DEUTSCH

- This booklet includes the specifications of Model SU-Z450 (Order No. HAD85032438C2) written in German and French.
- File this booklet together with the service manual of Model SU-Z450.

- Dieses Büchlein umfaßt die technischen Daten von Modell SU-Z450 (Bestell-Nr. HAD85032438C2) in den Sprachen Deutsch und Französisch.
- Bewahren Sie dieses Büchlein zusammen mit dem Service-Handbuch von Modell SU-Z450 auf.

- Cette brochure comprend les spécifications du Modèle SU-Z450 (N° d'Ordre HAD85032438C2) écrites en français et en allemand.
- Classer cette brochure en même temps qu'avec le manuel de service du Modèle SU-Z450.

DEUTSCH

■ TECHNISCHE DATEN

(DIN 45 500)

■ VERSTÄRKERTEIL

Dauerton-Ausgangsleistung bei 1 kHz	
beide Kanäle ausgesteuert	2 × 60W (8 Ω)
Dauerton-Ausgangsleistung bei 40 Hz ~ 20 kHz	
beide Kanäle ausgesteuert	2 × 50W (8 Ω)
Gesamtklirrfaktor	
Nennleistung bei 40 Hz ~ 20 kHz	0,05% (8 Ω)
halbe Nennleistung bei 1 kHz	0,007% (8 Ω)
Intermodulationsfaktor	
Nennleistung bei 60 Hz: 7 kHz = 4:1, nach SMPTE, 8 Ω	0,03%
Leistungsbandbreite	
beide Kanäle ausgesteuert bei −3 dB	10 Hz ~ 25 kHz (8 Ω, 0,03%)
Dämpfungsfaktor	40 (8 Ω)
Eingangsempfindlichkeit und -impedanz	
Phono	2,5 mV/47 kΩ
Tuner, CD/Aux, Tape 1, 2/EXT	150 mV/22 kΩ
Maximale TA-Eingangsspannung (1 kHz, eff.)	150 mV
Geräuschspannungsabstand	
Nennleistung (8 Ω)	
Phono	75 dB (nach IHF, A: 81 dB)
Tuner, CD/Aux, Tape 1, 2/EXT	90 dB (nach IHF, A: 97 dB)
Frequenzgang	
Phono	RIAA-Standardkurve ±0,8 dB (30 Hz ~ 15 kHz)
Tuner, CD/Aux, Tape 1, 2/EXT	10 Hz ~ 90 kHz (−3 dB)
Equalizer-Frequenz	80 Hz, 250 Hz, 1 kHz, 4 kHz, 12,5 kHz
Einstellbereich des Equalizers	±10 dB
Gehörrichtige Lautstärke korrektur (Loudness)	
(bei −30 dB Ausgangsleistung)	50 Hz, +9 dB
Ausgangsspannung	
Aufnahmeausgang (REC OUT)	150 mV
Kanalabweichung (CD/Aux, 250 Hz ~ 6300 Hz)	±1,0 dB
Übersprechdämpfung (CD/Aux, 1 kHz)	55 dB
Kopfhörerpegel und -impedanz	490 mV/330 Ω
Lautsprecherimpedanz	
MAIN oder REMOTE	4 Ω ~ 16 Ω
MAIN und REMOTE	8 Ω ~ 16 Ω

■ ALLGEMEINE DATEN

Leistungsaufnahme	290 W
Netzspannung	
Für England	Wechselstrom 50 Hz/60 Hz, 240V
Für Kontinentaleuropa	Wechselstrom 50 Hz/60 Hz, 220V
Abmessungen (B×H×T)	430 × 86 × 240 mm
Gewicht	4,9 kg

Bemerkung:
Der Gesamtklirrfaktor wurde mit einem digitalen Rauschspektrometer (Anlage H.P. 3045) gemessen.

(Spezifikationen Können infolge von Verbesserungen ohne Ankündigung geändert werden.)

FRANÇAIS

■ CARACTERISTIQUES

(DIN 45 500)

■ SECTION AMPLIFICATEUR

Puissance de sortie continue à 1 kHz
les deux canaux en circuit 2 × 60W (8Ω)
Puissance de sortie continue de 40 Hz~20 kHz,
les deux canaux en circuit 2 × 50W (8Ω)
Distorsion harmonique totale
à puissance nominale (40 Hz~20 kHz) 0,05% (8Ω)
à demi-puissance (1 kHz) 0,007% (8Ω)
Distorsion d'intermodulation
à puissance nominale à 60 Hz: 7 kHz=4:1, SMPTE, 8Ω
0,03%
Réponse de fréquences
les deux canaux en circuit, −3 dB
10 Hz~25 kHz (8Ω, 0,03%)
Coefficient d'amortissement 40 (8Ω)
Sensibilité et impédance d'entrée
PHONO 2,5 mV/47kΩ
SYNTONISATEUR, DISQUE COMPACT/AUX, BANDE 1, 2 (TUNER, CD/AUX, TAPE 1, 2/EXT) 150 mV/22kΩ
PHONO (tension d'entrée maximum, 1 kHz RMS) 150 mV
Signal/Bruit
à puissance nominale (8Ω)
PHONO 75 dB (IHF, A: 81 dB)
SYNTONISATEUR, DISQUE COMPACT/AUX, BANDE 1, 2 (TUNER, CD/AUX, TAPE 1, 2/EXT)
90 dB (IHF, A: 97 dB)
Réponse de fréquence
PHONO Courbe nominale RIAA
±0,8 dB (30 Hz~15 kHz)
SYNTONISATEUR, DISQUE COMPACT/AUX, BANDE 1, 2 (TUNER, CD/AUX, TAPE 1, 2/EXT)
10 Hz~90 kHz (−3 dB)
Compensateur de fréquences
80 Hz, 250 Hz, 1 kHz, 4 kHz, 12,5 kHz
Portée de variation du compensateur de éfréquences ±10 dB
Compensateur physiologique (volume à −30 dB)
50 Hz, +9 dB
Tension de sortie
SORTIE ENREGISTREMENT (REC OUT) 150 mV
Equilibrage des canaux, CD/AUX 250 Hz~6 300 Hz ±1,0 dB
Séparation des canaux, CD/AUX 1 kHz 55 dB
Niveau de sortie des casques et impédance 490 mV/330Ω
Impédance de charge
PRINCIPALE ou AUXILIAIRE (MAIN or REMOTE)
4Ω~16Ω
PRINCIPALE et AUXILIAIRE (MAIN and REMOTE)
8Ω~16Ω

■ DIVERS

Consommation 290W
Alimentation
Pour l'Europe CA 50 Hz/60 Hz, 240V
Pour le Royaume-Uni CA 50 Hz/60 Hz, 220V
Dimensions (L×H×Pr) 430 × 86 × 240 mm
Poids 4,9 kg

Remarques:
- La Société NATIONAL-PANASONIC-FRANCE, importateur du matériel MATSUSHITA-ELECTRIC déclare que cet appareil est conforme aux prescriptions de la directive 76/889/C.E.E. (arrêté 14 Janvier 1980).
- On mesure la distorsion harmonique totale au moyen d'un analyseur de spectre digital (Système H.P. 3045).

(Sujet à changement sans prearis.)

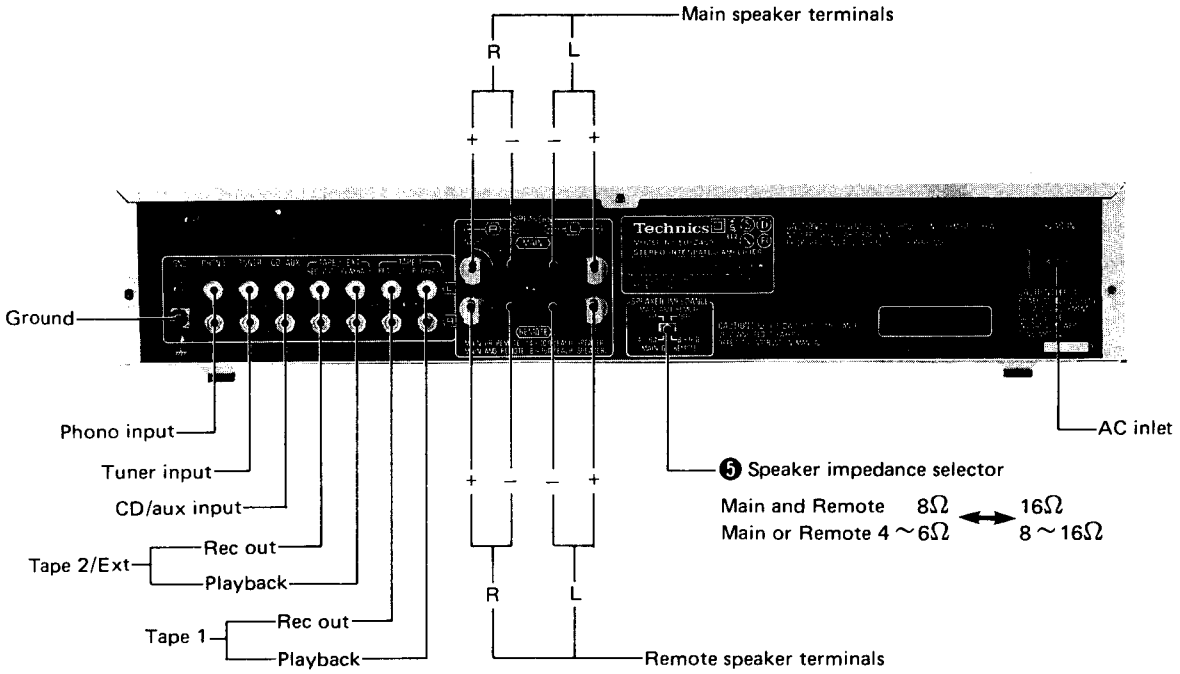
Printed in Japan
850404100 ® KK

❹ Frequency-equalization on/off switch (EQ)

This switch controls the equalizer function.
on (■→▲):
The five band equalizer is activated for use.
off (▲→■):
The sound will by-pass the equalizer circuit without change.

- The power supply for this unit varies depending upon the areas.
  Also, the parts used for power supply are different.

* 220V (60/60Hz) for continental Europe.
(Except for United Kingdom)
* 240V (50/60Hz) for United Kingdom.
* Phono input capacitance is about 150pF.



❺ Speaker impedance selector

Set to the position corresponding to the impedance of the speaker systems being used.
If this setting is not correctly made, the result may be a deterioration of performance.

- **If either the main or the remote speaker systems are used (4 16Ω):**

4 6Ω:
For speaker impedance of 4 6Ω.
8 16Ω:
For speaker impedance of 8 16Ω.

- **If both main and remote speaker systems are used (8 16Ω):**

8Ω:
For speaker impedance of 8Ω or more and less than 16Ω.
16Ω:
For speaker impedance of 16Ω.

Note that, if 2 pairs of speaker systems are used at the same time, determine the composite impedance as described below.

$$R = \frac{R_1 \times R_2}{R_1 + R_2}$$

Where:
R = total impedance
R_1 = impedance of speaker systems connected to "MAIN" terminals
R_2 = impedance of speaker systems connected to "REMOTE" terminals

Note:
Be sure to make this setting before switching the power "on".

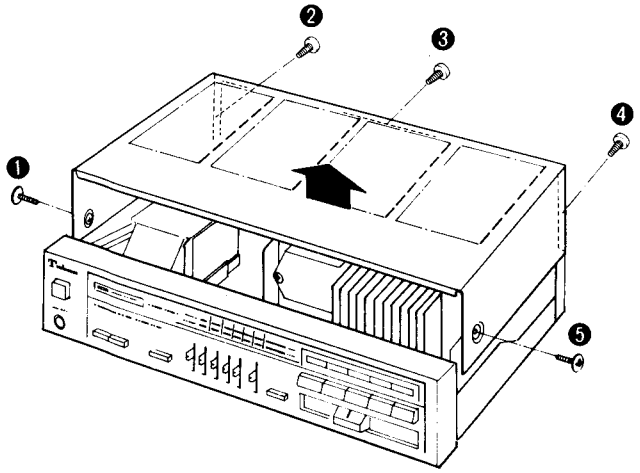
■ BEFORE REPAIR

1. Turn off the power, Discharge both power supply capacitors (C603, C604, 6800μF) through a 10 ohm, 5W resistor to ground. Do not short between C603 and C604. It may damage the capacitors.
2. After completion of repair, slowly apply the primary voltage by using a variac to avoid over current. Current consumption at 60Hz/50Hz in no signal mode should by shown below with respect to supply voltage 220V/240V.

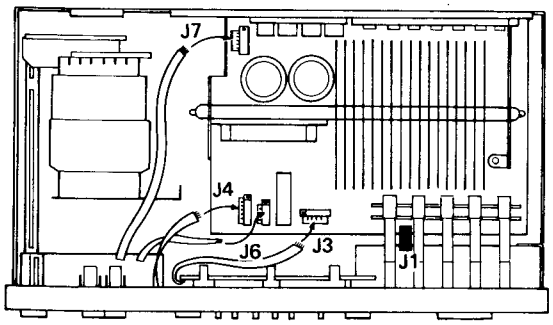
Power supply voitage		AC220V	AC240V
Consumed current	50Hz	50 ～220mA	60 ～200mA
	60Hz	60 ～190mA	55 ～180mA

■ DISASSEMBLY INSTRUCTIONS

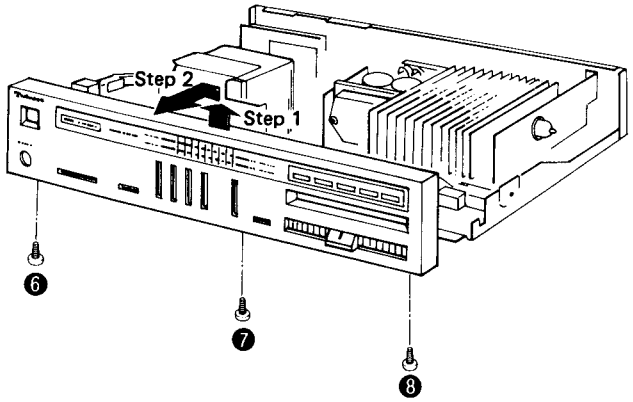
Ref. No. 1	How to remove the cabinet
Procedure 1	1. Remove the 5 setscrews. (❶ ~ ❺)



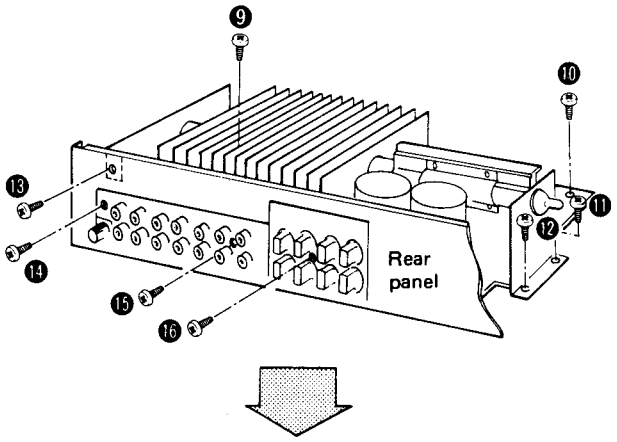
Ref. No. 2	How to remove the front panel
Procedure 1 →2	1. Remove the connector. (J1, J3, J4, J6 and J7)

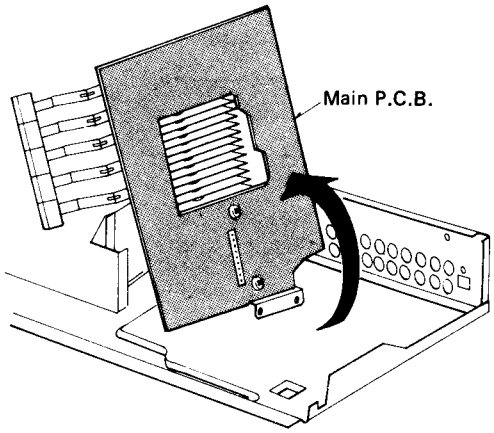


2. Remove the 3 screws. (❻ ~ ❽)
3. Remove the front panel.

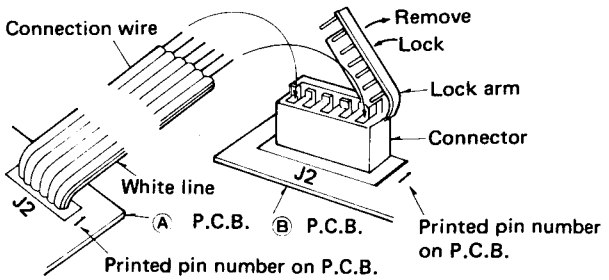


Ref. No. 3	How to remove the main P.C.B.
Procedure 1 →2 →3	1. Remove the 8 screws. (❾ ~ ⓰)

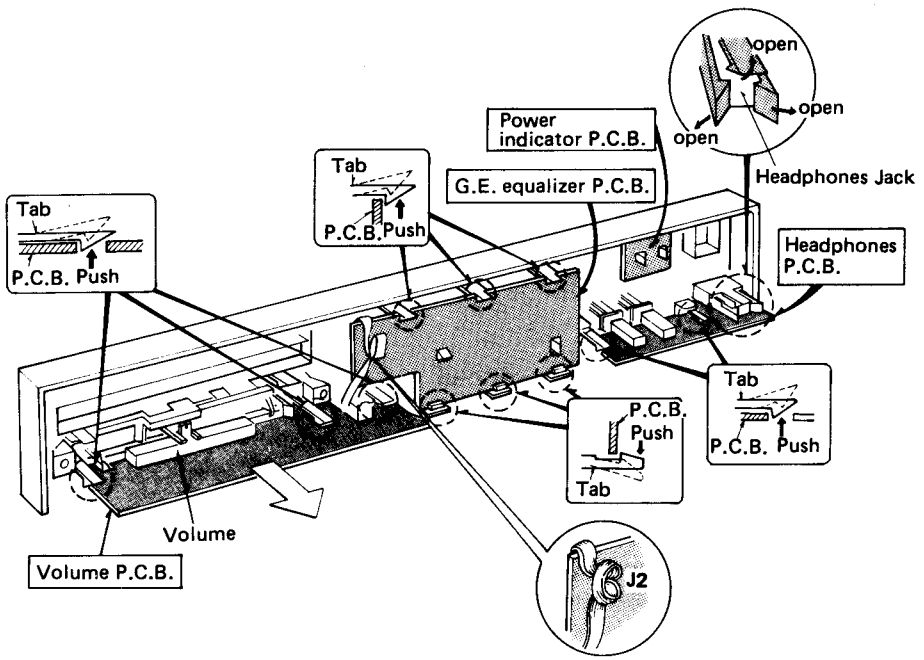




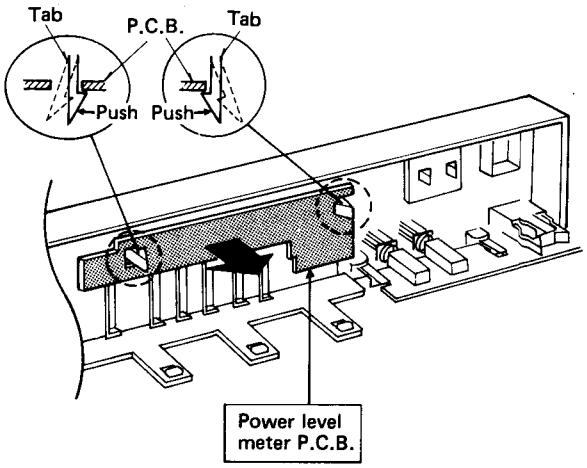
1. When removing the flat connection wire from the connector, open the lock arm as illustrated and then pull the wire.
2. When fitting the wire to the connector, connect it to the same J number (same connector) printed on the Ⓐ and Ⓑ P.C.B. as illustrated. In this case, check the pin number printed on the Ⓐ and Ⓑ P.C.B. and then insert the wire in the same direction. (Insert the white line printed side of flat connection wire into the pin number 1.)



Ref. No. 4	How to remove the other P.C.B.
Procedure	



1. For the repair of each P.C.B. attached to the front panel or replacement of knobs, remove the P.C.B. by pushing or releasing each tab as illustrated.
2. Bend the flat connection wire (**J2**) at the back of graphic equalizer P.C.B. as shown above.
3. Graphic equalizer P.C.B. can be removed without removing the front panel from the chassis.
4. Remove the power level meter P.C.B. from the front panel after removing the graphic equalizer as shown on the right.



■ PROTECTION CIRCUITRY

The protection circuitry may have operated if either of the following conditions is noticed:

- No sound is heard when the power is turned on.
- Sound stops during a performance.

The function of this circuitry is to prevent circuitry damage if, for example, the positive and negative speaker connection wires are "shorted", or if speaker systems with an impedance less than the indicated rated impedance of this unit are used.

If this occurs, follow the procedure outlines below:

1. Turn off the power.
2. Determine the cause of the problem and correct it.
3. Turn on the power once again after one minute.

Note

When the protection circuitry functions, the unit will not operate unless the power is first turned off and then on again.

■ TECHNICAL INFORMATION

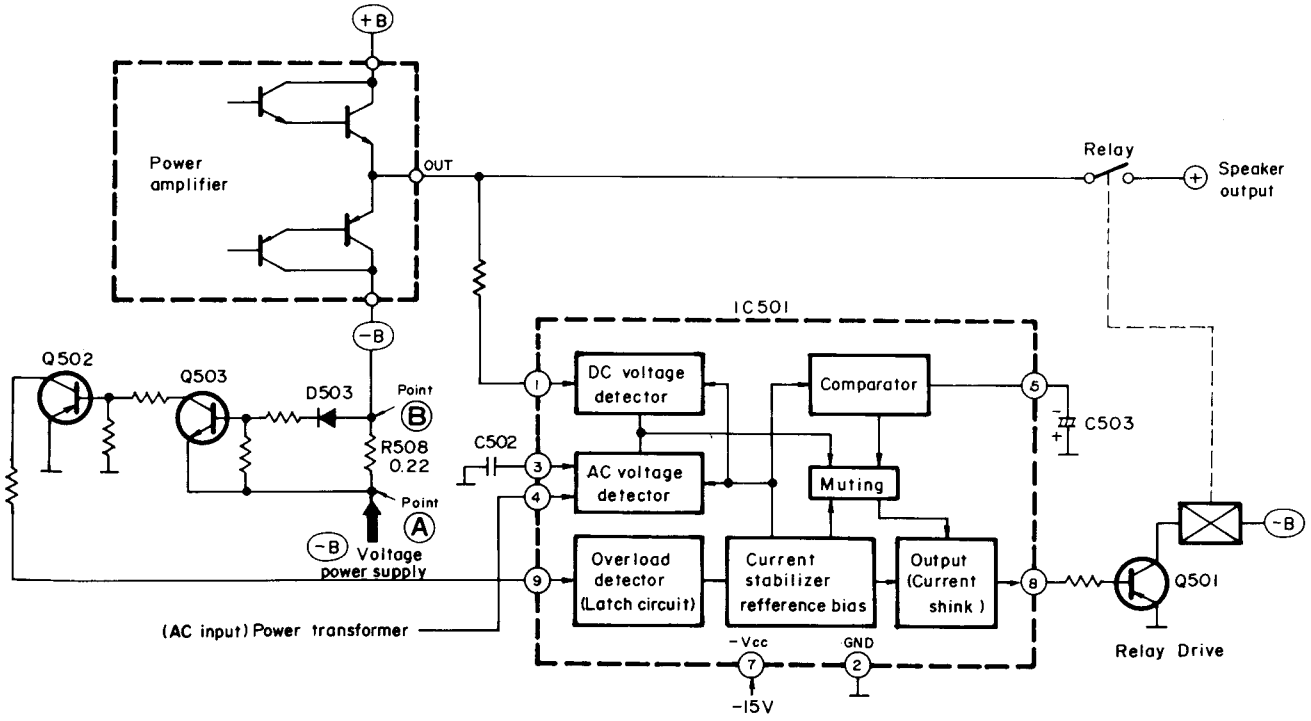
- **Muting operation with power ON**
  1. When power is turned ON, AC voltage is applied to No. ④ pin of IC501.
  2. Next, the time constant setting capacitor (C503) connected to No. ⑤ pin begins to be charged.
  3. When the voltage reaches about −2V (3 seconds after power ON), the muting circuit turns ON, and then −15V voltage is output to No. ⑧ pin.
  4. When minus voltage is output to No. ⑧ pin, Q501 turns ON causing speaker protecting relay to turn ON. (Speaker terminal is connected to power amplifier.)

- **Muting operation with power OFF**
  1. When power is turned OFF, the time constant setting capacitor (C502) connected to No. ③ pin is discharged, then AC detection circuit operates to turn the muting circuit OFF.
  2. When the muting circuit is turned OFF, the voltage of No. ⑧ pin becomes 0V and speaker protecting relay turns OFF.

- **Muting operation during power amplifier overload**
  1. If power amplifier is operated with the speaker terminals short-circuited or by using a speaker whose impedance is less than the rating, then a large current will flow into the power amplifier through R508.
  2. When the voltage of point Ⓑ is about 1.4V higher than that of point Ⓐ, then Q503 and Q502 turn ON.
  3. With Q502 turned ON, the voltage of IC501 No. ⑨ pin becomes nearly 0V.
  4. Usually, IC501 No. ⑨ pin and No. ⑦ pin are equal in potential, but if the potential difference exceeds 0.6V, the latch circuit will function and then no voltage is generated at No. ⑧ pin.
  5. Therefore, relay drive transistor (Q501) turns ON.

- **Operation of DC detection circuit**

  If a plus or minus DC voltage comes out of power amplifier, then the DC detection circuit operates, the muting circuit turns OFF and the speaker protecting relay also turns OFF.



• Band Pass Filter

There are many types of band pass filter (BPF) of graphic equalizer. Introduced here are a circuit using semi-conductive inductor.

• BPF using semi-conductive inductor

BPF requires L, and a large core is required if coil is used, and the performance is relatively low. So, the semi-conductive inductor circuit is designed so that the characteristics equivalent to coil can be obtained.

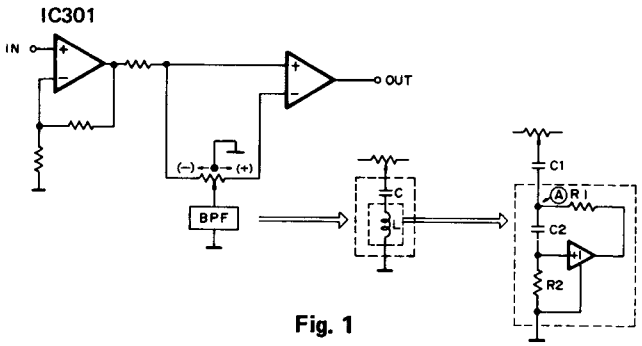


Fig. 1

– Inductor changes in impedance in proportion to the frequency –

1. As the input frequency from **C1** increases, the impedance of **C2** decreases and the input level to the amplifier becomes higher.
2. Output level of amplifier becomes higher.
3. Voltage of point Ⓐ via feed-back impedance **R1** increases.
4. That is, the impedance earthed to point Ⓐ increases in proportion to frequency (showing the same characteristic as **L**).
5. The circuit has **C1** and **L** forming a series resonant circuit, and the frequency characteristic obtained has center frequency (fo).

– Calculation of center frequency –

$$(L = R1 \cdot R2 \cdot C2)\ (C = C1)$$

$$fo\ (Hz) = \frac{1}{2\pi\sqrt{LC}} = \frac{1}{2\pi\sqrt{R1\ (\Omega) \cdot R2\ (\Omega) \cdot C2\ (F) \cdot C1\ (F)}}$$

• Band level control circuit

(for varying the center frequency by ± 10dB)

The euqalizer circuit of this unit is shown in Fig. 2. When the control volume (VR) is turned in the direction of → (+), NF level lowers with the connection shown in Fig. 3. causing the gain of operation amplifier to increase, then the "peak" apperas. Contrarily, when VR is turned in the direction of ← (–), the input impedance of operation amplifier becomes lowered with the connection shown in Fig. 4. Then the frequency level is "dip".

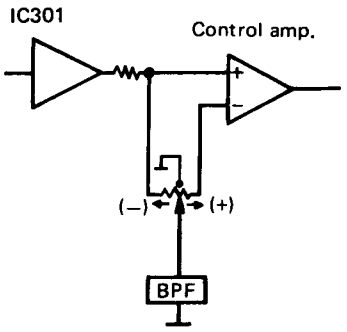


Fig. 2

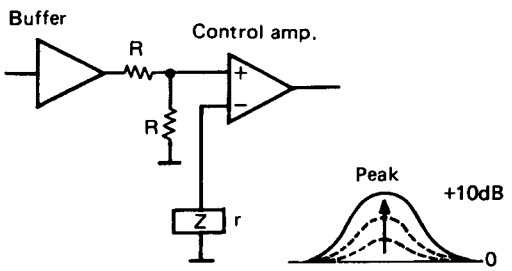


Fig. 3

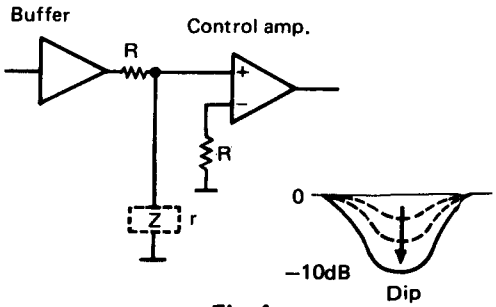


Fig. 4

■ RESISTORS & CAPACITORS

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice. Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer s specified parts.
3. The "Ⓢ" mark is service standard parts and may differ from production parts.
4. The unit of resistance is Ω(ohm), K = 1000Ω, M = 1000kΩ.
5. The unit of capacitance is μF (microfarad). P = 10^{-6} μF
6. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value

Resistor Type	Wattage	Tolerance
ERD : Carbon ERG : Metal Oxide ERX : Metal Film	1A : 1W 2A : 2W S2 : 1/4W 25 : 1/4W	J : ±5%

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Volgage	Value	Tolerance	Peculiarity

Capacitor Type	Voltage	Tolerance
ECE : Electrolytic ECC : Ceramic ECK : Ceramic ECF : Semi-conductor ECQ : Polyester	0J : 6.3V 56V : 56V 1A : 10V 1J : 63V 1C : 16V KC : 400V AC 1E : 25V D : 25V 1H : 50V	K : ±10% Z : +80%, −20% M : ±20% P : +100%, −0%

● RESISTORS

Ref. No.	Part No.	Value
R101, 102 [EGA] only	ERDS2TJ471	470
R103, 104 [EGA] only	ERDS2TJ102	1K
R105, 106 [EGA] only	ERDS2TJ102	1K
R107, 108 [EGA] only	ERDS2TJ102	1K
R109, 110 [EGA] only	ERDS2TJ102	1K
R201, 202	ERDS2TJ391	390
R203, 204	ERDS2TJ224	220K
R205, 206	ERDS2TJ563	56K
R207, 208	ERDS2TJ271	270

Ref. No.	Part No.	Value
R209, 210	ERDS2TJ184	180K
R211, 212	ERDS2TJ123	12K
R213, 214	ERDS2TJ563	56K
R215, 216	ERDS2TJ561	560
R301, 302	ERDS2TJ562	5.6K
R303, 304	ERDS2TJ474	470K
R305, 306	ERDS2TJ472	4.7K
R307, 308	ERDS2TJ393	39K
R309, 310	ERDS2TJ472	4.7K
R311, 312	ERDS2TJ103	10K
R313	ERDS2TJ561	560
R321, 322	ERDS2TJ222	2.2K
R401, 402	ERDS2TJ102	1K
R403, 404	ERDS2TJ223	22K
R405, 406	ERDS2TJ122	1.2K

Ref. No.	Part No.	Value
R407, 408	ERDS2TJ223	22K
R409	ERDS2TJ273	27K
R410 Ⓢ ⚠	ERD25FJ271	270
R411, 412	ERDS2TJ103	10K
R413, 414	ERDS2TJ103	10K
R415, 416 [EGA] Ⓢ ⚠	ERD25FJ4R7	4.7
R415, 416 other Ⓢ ⚠	ERD25FJ100	10
R417, 418	ERG2ANJ331	330
R419 Ⓢ ⚠	ERD25FJ331	330
R501, 502	ERDS2TJ333	33K
R503	ERDS2TJ103	10K
R504	ERDS2TJ124	120K

Ref. No.	Part No.	Value
R505	ERDS2TJ223	22K
R506	ERG2ANJ271	270
R507	ERG2ANJ221	220
R508, 509 Ⓢ	ERX1ANJR22	0.22
R510	ERDS2TJ273	27K
R511	ERDS2TJ153	15K
R512	ERDS2TJ473	47K
R513, 514	ERDS2TJ153	15K
R601	ERG2ANJ391	390
R602, 603	ERG2ANJ331	330
R604	ERG2ANJ331	330
R701, 702	ERDS2TJ334	330K
R703, 704	ERDS2TJ103	10K
R705, 706	ERDS2TJ103	10K
R707 Ⓢ ⚠	ERD25FJ470	47

● CAPACITORS

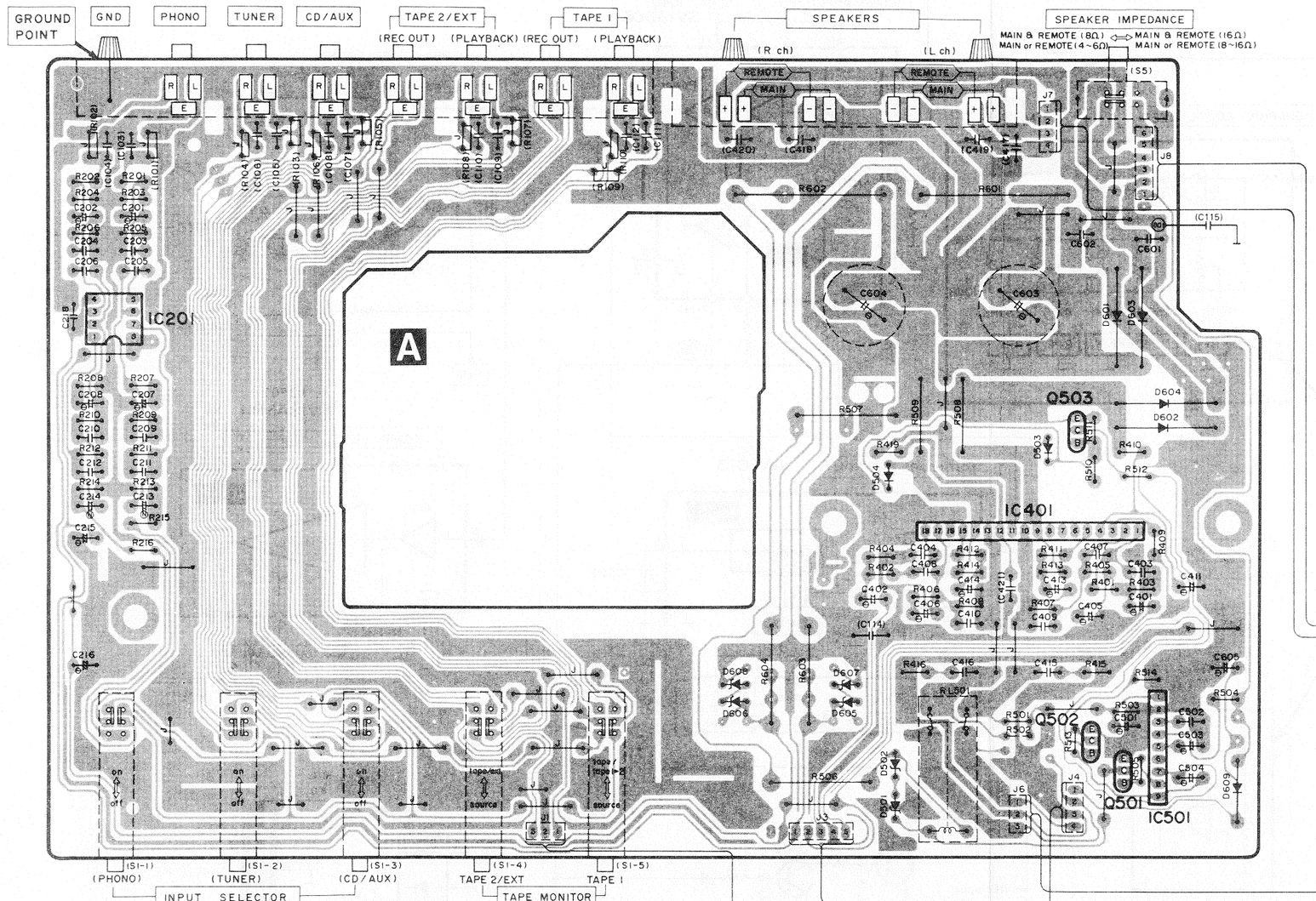
Ref. No.	Part No.	Value
C1 ⚠	ECKDKC103PF2	0.01
C103, 104 Ⓢ [EGA] only	ECCD1H151K	150P
C105, 106 Ⓢ [EGA] only	ECCD1H101K	100P
C107, 108 Ⓢ [EGA] only	ECCD1H101K	100P
C109, 110 Ⓢ [EGA] only	ECCD1H101K	100P
C111, 112 Ⓢ [EGA] only	ECCD1H101K	100P
C114 Ⓢ [EGA] only	ECCD1H100K	10P
C115 Ⓢ [EGA] only	ECKD1H223ZF	0.022
C201, 202	ECEA1HU3R3	3.3
C203, 204 Ⓢ	ECCD1H101K	100P
C205, 206 Ⓢ	ECKD1H102KB	0.001
C207, 208	ECEA0JU330	33
C209, 210	ECFTD223KXL	0.022
C211, 212	ECFTD682KXL	0.0068
C213, 214 ⚠	ECEA1HN010S	1

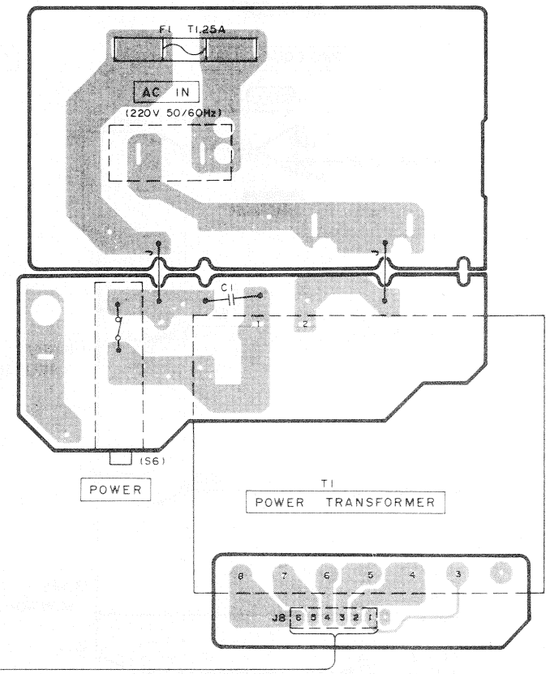
Ref. No.	Part No.	Value
C215	ECEA1CU101	100
C216	ECEA1CU471	470
C217 Ⓢ [EGA] only	ECKD1H103ZF	0.01
C218 Ⓢ	ECKD1H103ZF	0.01
C301, 302	ECFTD563KXL	0.056
C303, 304	ECEA1EU3R3	3.3
C305, 306 Ⓢ	ECCD1H101K	100P
C307, 308 Ⓢ	ECCD1H101K	100P
C309, 310	ECEA1CU220	22
C311, 312 Ⓢ	ECCD1H330K	33P
C313, 314	ECEA1HU3R3	3.3
C315 Ⓢ	ECKD1H223ZF	0.022
C317, 318	ECEA1CU100	10
C321, 322 Ⓢ	ECKD1H331KB	330P
C323, 324	ECEA1EU3R3	3.3
C325, 326	ECFTD563KXL	0.056
C327, 328	ECEA1HU010	1
C329, 330	ECFTD223KXL	0.022
C331, 332	ECEA1HKR22	0.22
C333, 334	ECFTD472KXL	0.0047
C335, 336	ECFTD683KXL	0.068
C337, 338 Ⓢ	ECKD1H102KB	0.001
C339, 340	ECFTD183KXL	0.018

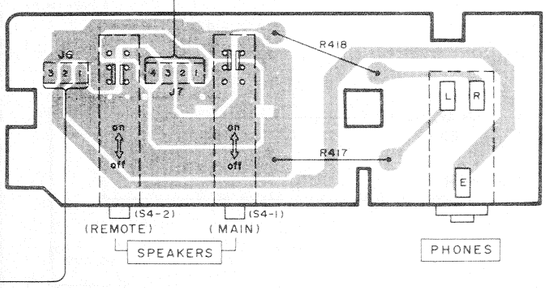
Ref. No.	Part No.	Value
C341, 342 Ⓢ	ECKD1H391KB	390P
C343, 344	ECFTD682KXL	0.0068
C345, 346	ECEA1CKS100	10
C347	ECEA1HKS010	1
C348	ECEA1AKS330	33
C401, 402	ECEA1EU3R3	3.3
C403, 404 Ⓢ	ECCD1H221K	220P
C405, 406	ECEA0JU470	47
C407, 408 Ⓢ [EGA]	ECKD1H222KB	0.0022
C407, 408 Ⓢ other	ECKD1H561KB	560P
C409, 410 Ⓢ [EGA]	ECCD1H330K	33P
C409, 410 Ⓢ other	ECCD1H270K	27P
C411	ECEA1JU220	22
C413, 414	ECEA1HU4R7	4.7
C415, 416 Ⓢ	ECKD1H473ZF	0.047
C417, 418 Ⓢ [EGA] only	ECKD1H223ZF	0.022

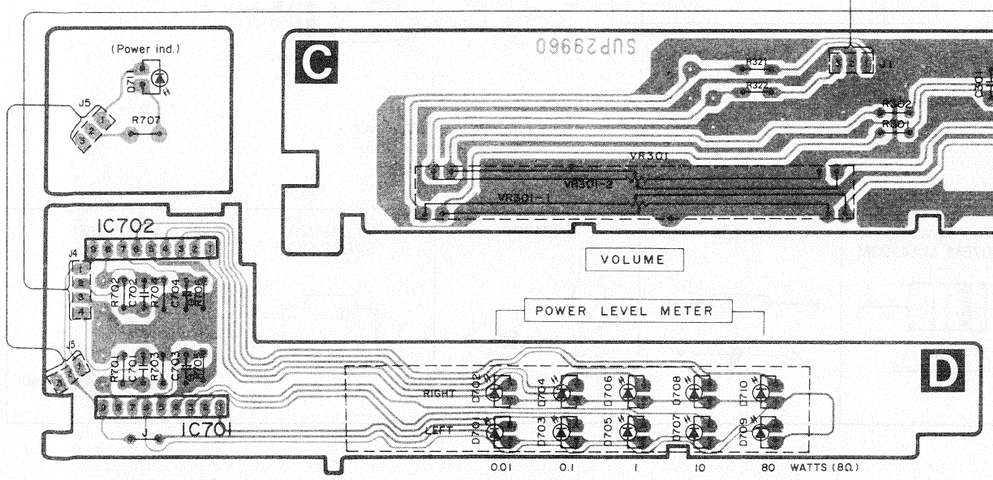
Ref. No.	Part No.	Value
C419, 420 Ⓢ [EGA] only	ECKD1H223ZF	0.022
C421 Ⓢ [EGA] only	ECKD1H223ZF	0.022
C423, 424 Ⓢ [EGA] only	ECCD1H221K	220P
C425, 426 Ⓢ [EGA] only	ECKD1H271KB	270P
C501	ECEA0JU331	330
C502	ECFTD223KXL	0.022
C503	ECEA0JU470	47
C504	ECEA1CU100	10
C601, 602 Ⓢ [EGA]	ECQM1H823JZ	0.082
C601, 602 Ⓢ Other	ECKD1H223ZF	0.022
C603, 604	ECETS56V682U	6800
C605	ECEA1CU471	470
C701, 702 Ⓢ	ECKD1H103MD	0.01
C703, 704	ECEA1CKS100	10

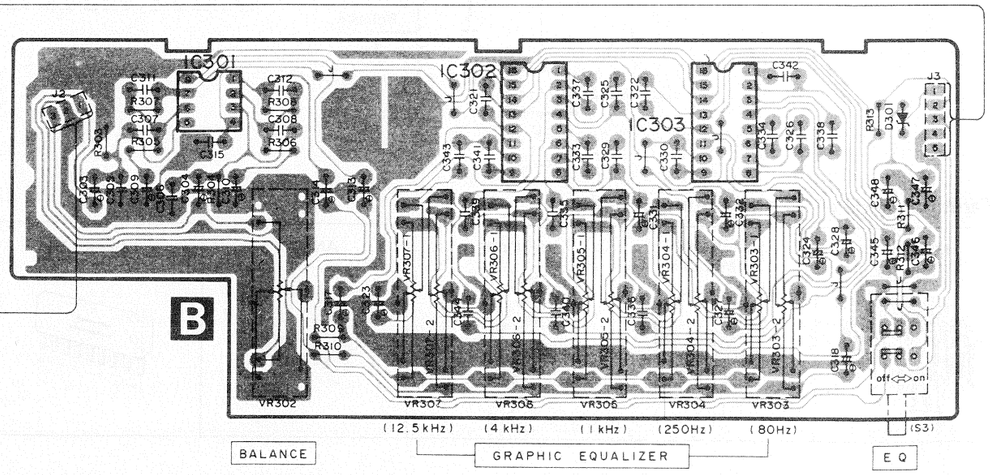
■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM











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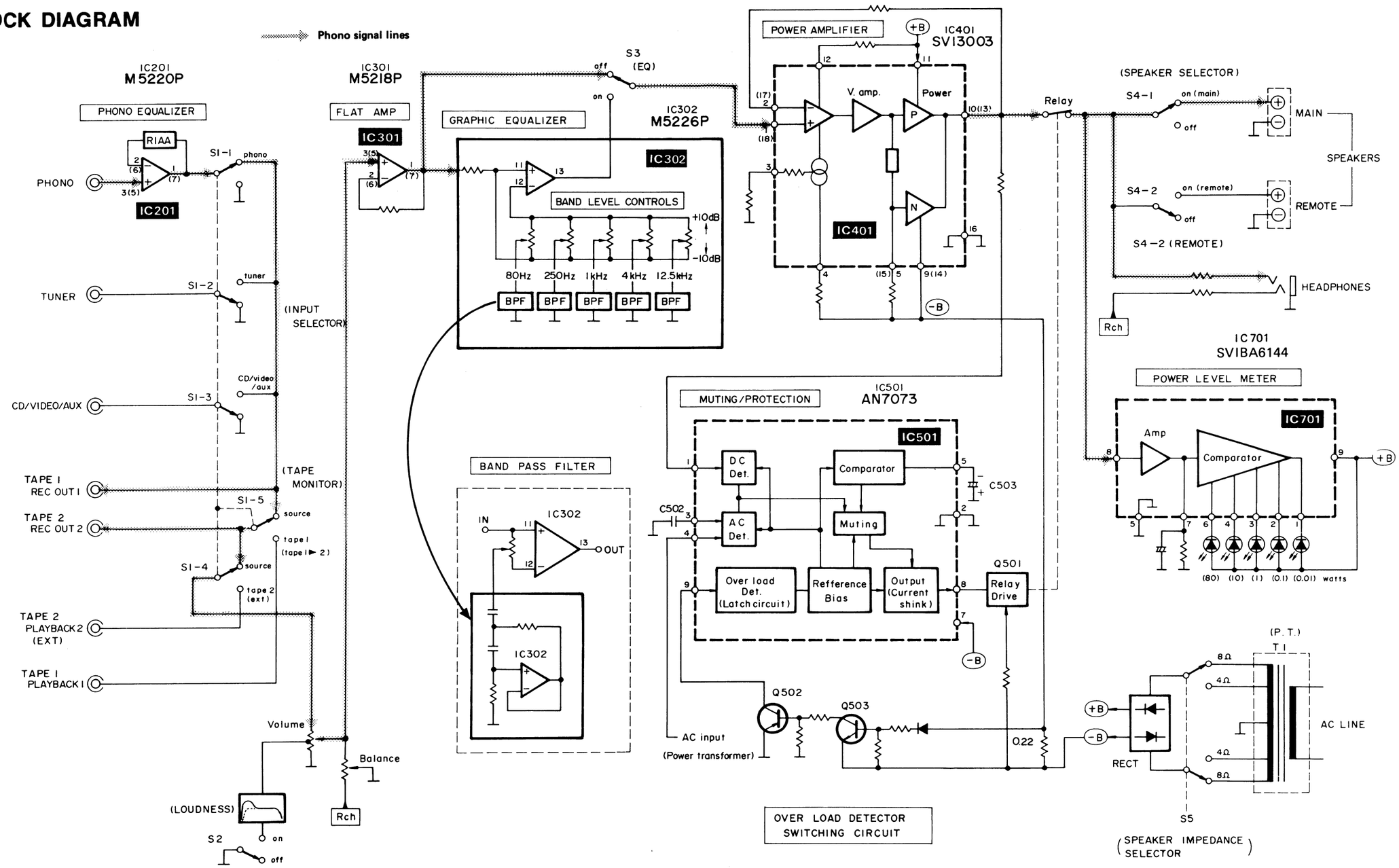
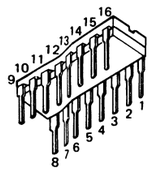
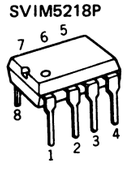
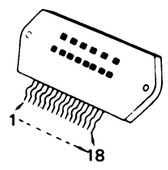
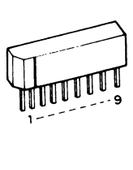
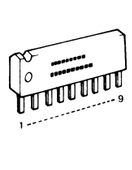
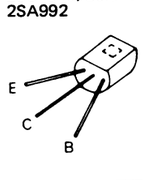
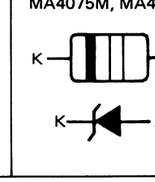
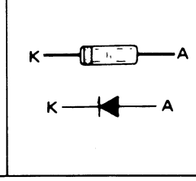
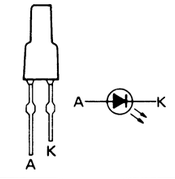
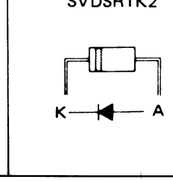
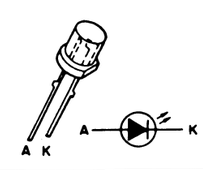
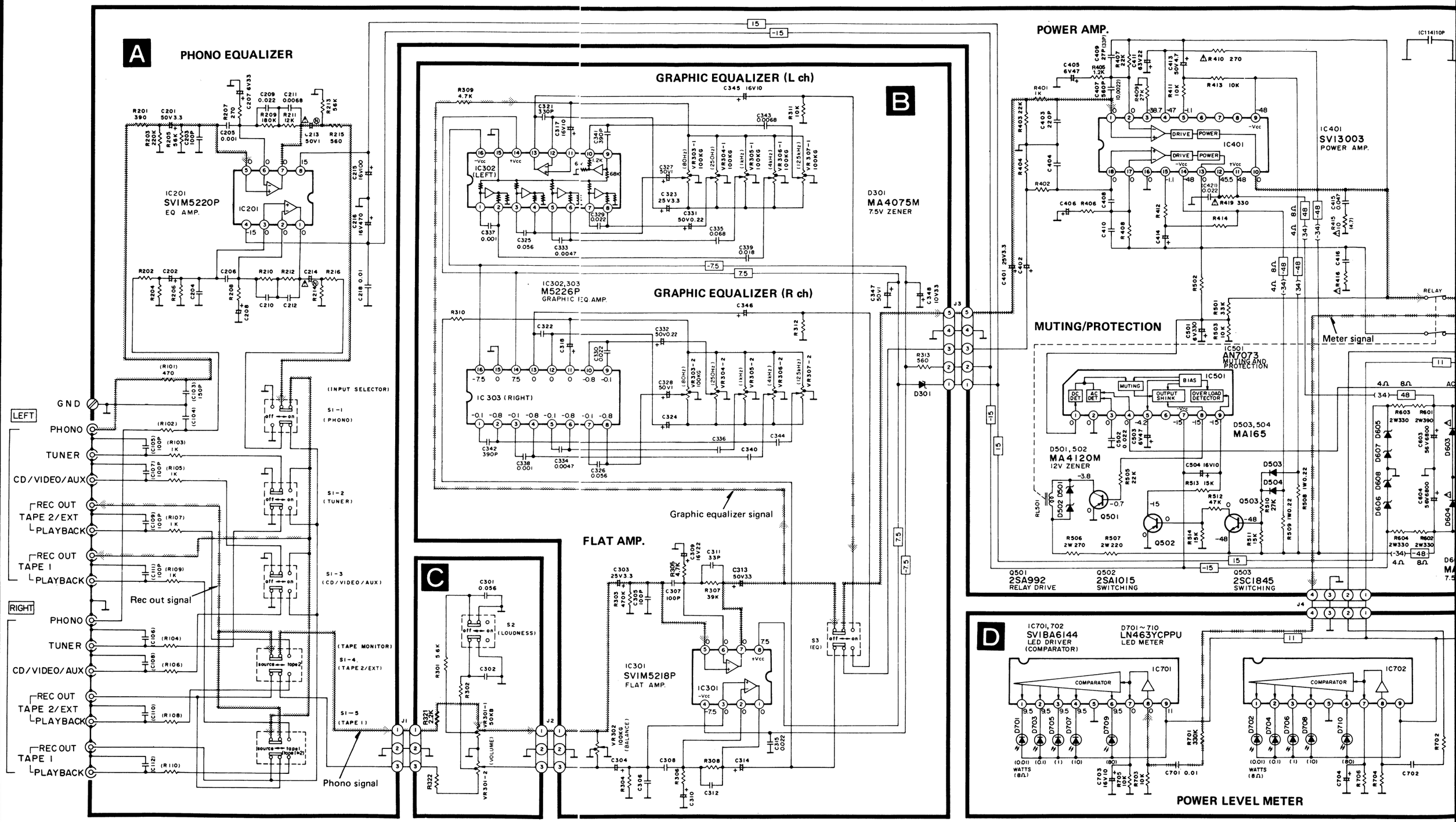
■ BLOCK DIAGRAM



• Terminal guide of IC, transistor and diode

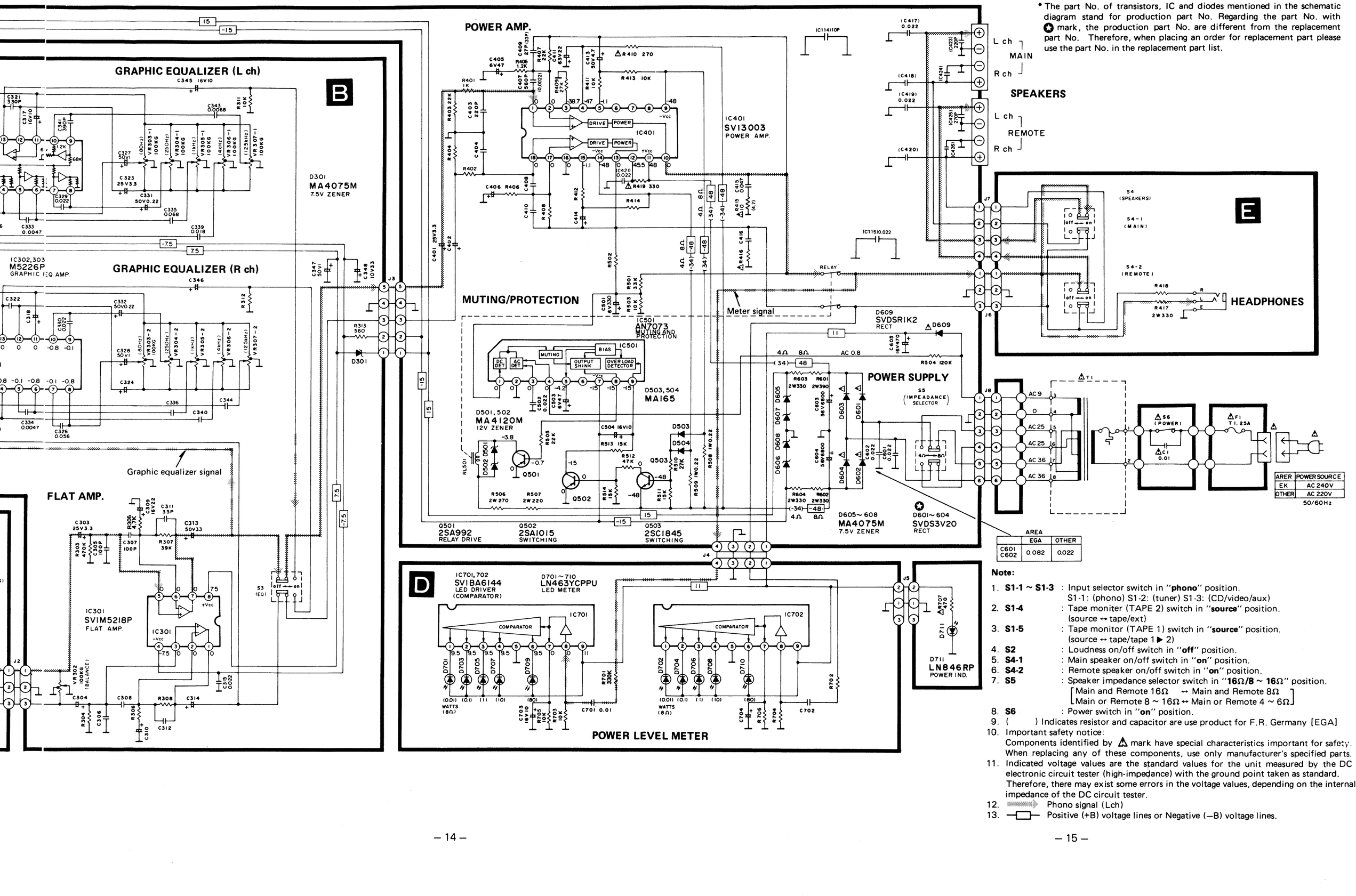
M5226P	SVIM5220P SVIM5218P	SVI3003	AN7073	SVIBA6144	2SC1845, 2SA1015 2SA992	MA4110, MA4150 MA4075M, MA4120M	MA165	LN846RP	SVDS3V20 SVDSR1K2	LN463YCPPU
										

■ SCHEMATIC DIAGRAM (This schematic diagram may be modified at any time with the development of new technology.)



( ) Indicates resistor and capacitor are use product for F.R. Germany [EGA].

th the development of new technology.)



* The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ✪ mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part please use the part No. in the replacement part list.

ARER	POWER SOURCE
EK	AC 240V
OTHER	AC 220V

50/60Hz

Note:

1. **S1-1 ~ S1-3** : Input selector switch in "**phono**" position.
   S1-1: (phono) S1-2: (tuner) S1-3: (CD/video/aux)
2. **S1-4** : Tape moniter (TAPE 2) switch in "**source**" position.
   (source ↔ tape/ext)
3. **S1-5** : Tape monitor (TAPE 1) switch in "**source**" position.
   (source ↔ tape/tape 1 ▶ 2)
4. **S2** : Loudness on/off switch in "**off**" position.
5. **S4-1** : Main speaker on/off switch in "**on**" position.
6. **S4-2** : Remote speaker on/off switch in "**on**" position.
7. **S5** : Speaker impedance selector switch in "**16Ω/8 ~ 16Ω**" position.
   [Main and Remote 16Ω ↔ Main and Remote 8Ω
   Main or Remote 8 ~ 16Ω ↔ Main or Remote 4 ~ 6Ω]
8. **S6** : Power switch in "**on**" position.
9. ( ) Indicates resistor and capacitor are use product for F.R. Germany [EGA]
10. Important safety notice:
    Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
11. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the ground point taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
12. ▒▒▒ Phono signal (Lch)
13. —□— Positive (+B) voltage lines or Negative (—B) voltage lines.

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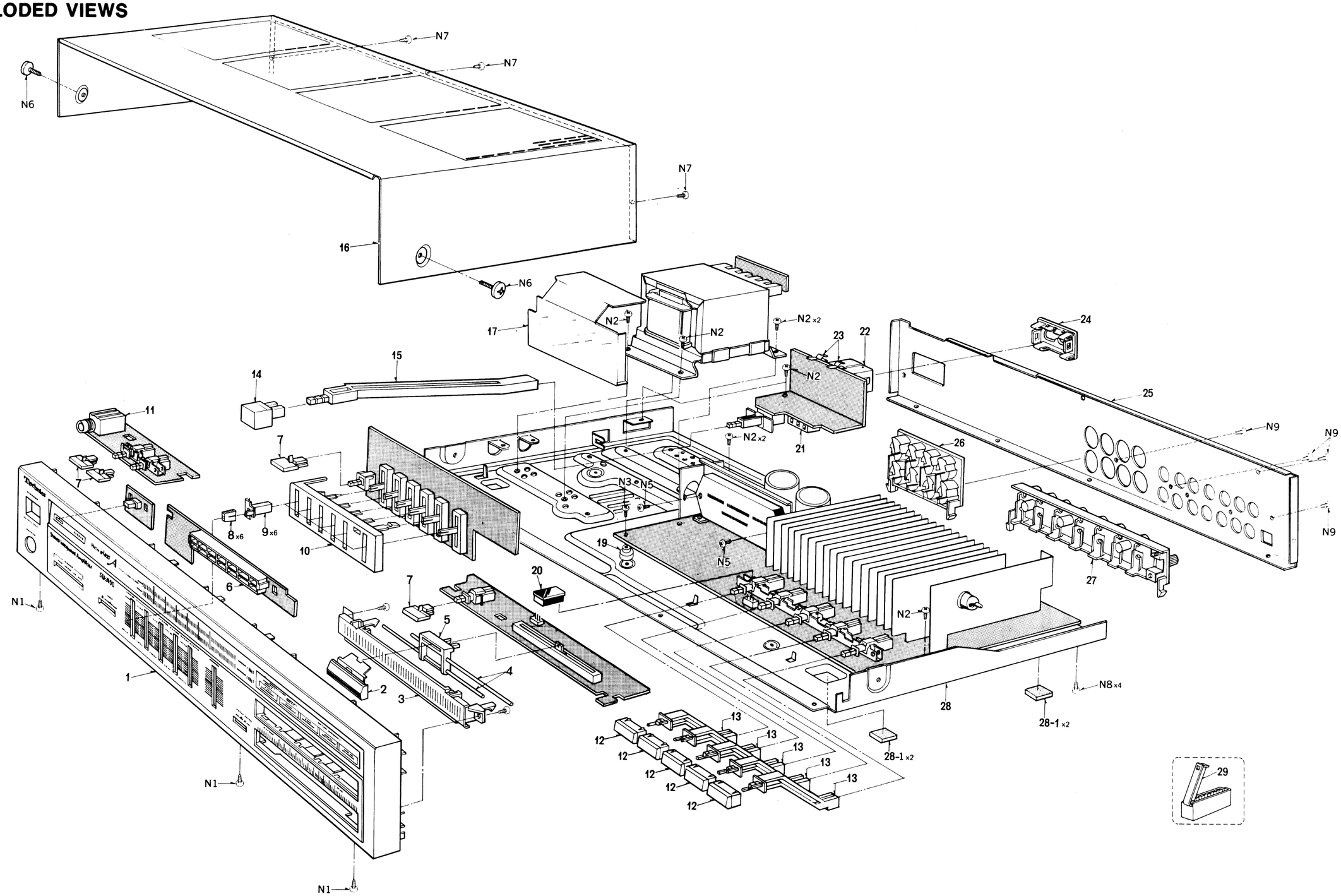
■ EXPLODED VIEWS



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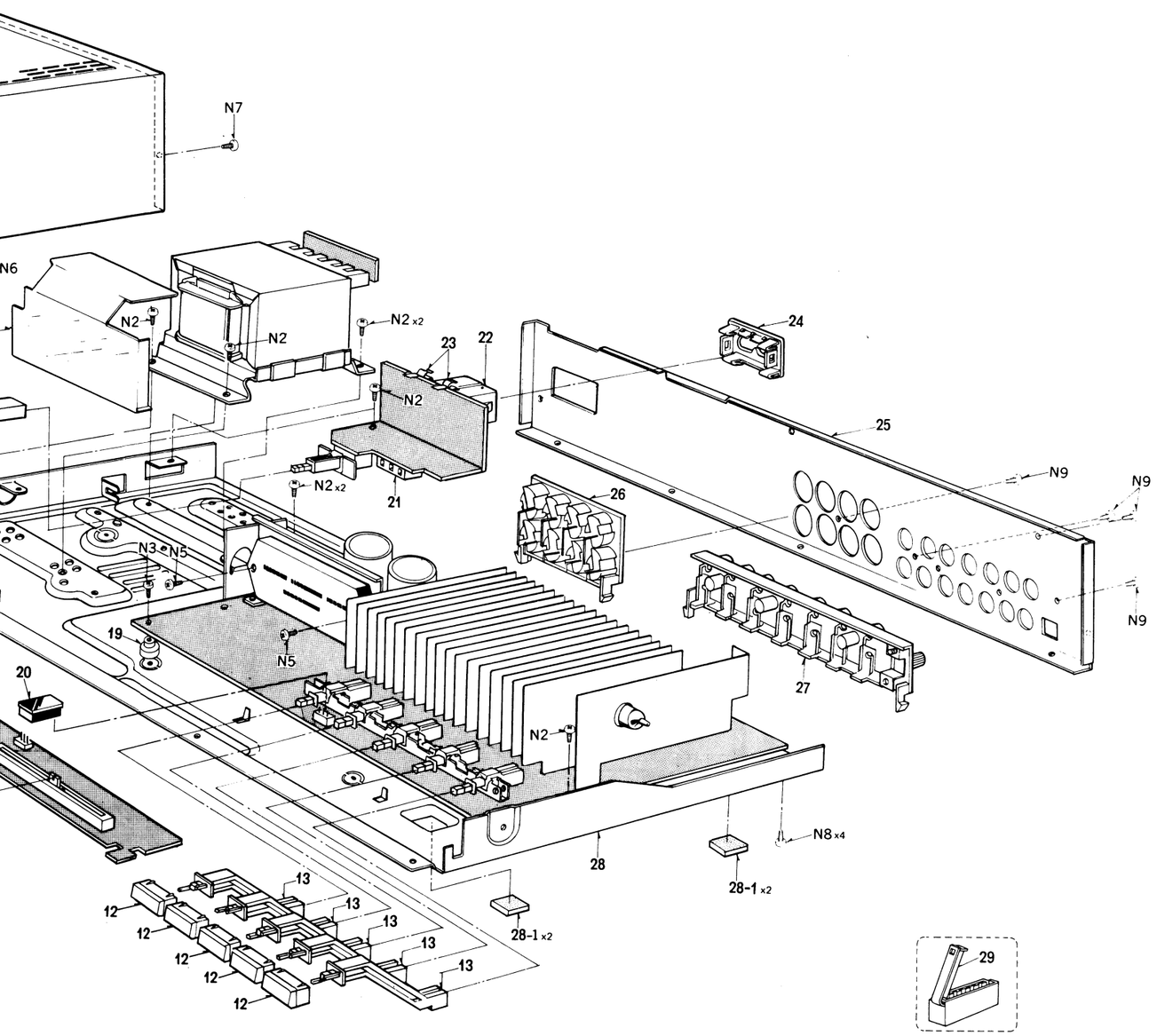
N7
N6
N2
N2 x2
23
22
24
25
N9
N3
N5
21
26
19
27
20
28
28-1 x2
N8 x4
12
13
29

| | | |